

A TAXONOMIC STUDY ON THE GENUS *Holobremia* KIEFFER 1912 WITH DESCRIPTION OF A NEW SPECIES FROM CHINA (DIPTERA, CECIDOMYIIDAE)

JIAO Ke-Long BU Wen-Jun*

Institute of Entomology, College of Life Sciences, Nankai University, Tianjin 300071, China

Abstract The purpose of this paper is to provide a review of the diagnostic characteristics of the genus *Holobremia* Kieffer and a key to the world's male *Holobremia* species. One new species, *Holobremia bipiraninensis* sp. nov., from Yunnan, China is described and illustrated. The type specimens were deposited in the Institute of Entomology, College of Life Sciences, Nankai University, Tianjin, China.

Key words *Holobremia bipiraninensis*, Monodiplosini, Cecidomyiidae, Diptera, new species

1 Introduction

Kieffer established the genus *Holobremia* in 1912 to include the species *Bremia fallacioris* Kieffer, 1904, from Bitche, France. Kieffer (1913) also described another species named *Holobremia lignicola* from Bitche, France. Finally, Kashyap (1987) described *Holobremia cylindria* (misspelled as *cylindrius*) from Jammu and Kashmir, Srinagar, India. Until now, only these three species have been reported worldwide. The larvae of the species from France were mycetophagous (Mamaev, 1969), while the one from India was collected from a spider's web on a *Thuja* plant (Kashyap, 1987).

The male antennae in *Holobremia* are the same as the female, likewise in other genera of the tribe Monodiplosini (Skuhravá, 1997). According to Mamaev (1965), *Holobremia* evolved from *Platetella* Westwood by the substitution of antennae, which occurred so rapidly that other characters of the genus showed no substantial change.

As only about one hundred species of Chinese gall midges have been reported, the fauna of this family have received very little study. During the course of this research on gall midges of the supertribe Cecidomyiini, one new species of *Holobremia* from China was discovered.

2 Materials and Methods

The specimens involved in the present paper were collected in Yunnan, China in 2001 by colleagues of Nankai University. As soon as the specimens were collected in the field, they were dipped and preserved in vials with 70% alcohol. Each individual was dissected into four parts and mounted in Canada balsam on a microscope slide. The morphological

terminology follows Gagné (1981).

Type specimens and other new materials were deposited in the Institute of Entomology, College of Life Sciences, Nankai University, Tianjin, China.

3 Genus *Holobremia* Kieffer, 1912

Holobremia Kieffer, 1912: 1. Type species, *Bremia fallacioris* Kieffer (original species).

Holobremia Shinji, 1944: 232 (misspelling).

3.1 Redescription of the generic characteristics

Adult body length 1.4–2.0 mm. Eyes holoptic on vertex. Palpus four-segmented, last three segments longer. Antenna 2 + 12-segmented, flagellomeres subcylindrical, a little constricted at about basal third, each node with one or two whorls of simple, band-shaped circumfila, and two whorls of strong setae, one basal and one subapical, whorl neck shorter, 1/6–1/3 the length of node, first and second flagellomeres fused, terminal flagellomere with apical prolongation with microtrichia. Wing hyaline, vein R_5 arched backwards, joining costa beyond wing apex, R_s very weak, only visible at base, vein Cu forked, legs long and thin, claw toothed on all legs, curved almost at right angle, empodium shorter than the claw. Male Genitalia: gonostylus arched and thin, with a terminal tooth, except for a little broad at base with microtrichies; gonocoxite with a mediobasal lobe; cerci discrete, lobes rounded apically; hypoproct not shorter than cerci; linear, blunt or rounded apically, its length variant in different species; aedeagus cylindrical, fuscous and highly sclerotized, longer than cerci and hypoproct approximately as long as or longer than gonocoxite, broadened or variously modified at apex. Ovipositor simple, very short and not protrusile.

3.2 Discussion

The characteristics of the genus *Holobremia* given

This project was supported by the National Science Foundation of China (30725005 and J0630963).

* Corresponding author. E-mail: wenjunbu@nankai.edu.cn

Received 25 Sep. 2009, accepted 6 Nov. 2009

by Kieffer (1912) were based on the type species *H. fallacicornis*. With the increase of the number of species, however, some of the generic characteristics are incorrect for other species and thus a revision of the common characteristics of *Holobromia* is necessary.

In the description of generic characteristics of Kieffer (1912), some data described and illustrated as "MALE 1.7 mm long" and "stem 1/3 or 1/4 the length of enlargement", were too exact to be broadly applicable. Compared with other species, this study gives a range of "Body length 1.4-2.0 mm" and "neck 1/6-1/3 the length of node". In addition, each flagellomere of the species found in the Palearctic Region possesses two whorls of simple band-shaped circumfila while the ones from the Oriental Region possess only one. Other corrections are that the aedeagus is not "hardly longer", but is approximately as long as or longer than the gonocoxite and the hypoproct should be as long as or longer than the cerci.

An additional description based on *H. fallacicornis* Kieffer by Manaev (1969) was expressed as "aedeagus deeply pigmented, highly sclerotized" and "larvae mycetophagous".

In the key to genera of tribe Monodiplosini (Skuhravá, 1997), the description of *Holobromia* was expressed as "gonocoxite medibasally without a small lobe", but in fact most of the species in the genus *Holobromia* have medibasal lobes which are not more conspicuous than the ones in the genus *Gynandrobromia* of the same tribe. Therefore, it is not proper to state that gonocoxites are without medibasal lobes and it is incorrect to use this characteristic to distinguish *Holobromia* from other genera in the same tribe.

3.3 Classification

In this paper, we separated all the species of the genus into two groups according to the presence or absence of an aedeagal sheath. The first group was the *H. fallacicornis* group with aedeagal sheath, including *H. fallacicornis* and *H. ligniola*. The second group was the *H. cylindrica* group without aedeagal sheath, including *H. cylindrica* and *H. bipromiens* sp. nov.

4 Key to Species of *Holobromia* of the World (Males)

1. Aedeagus with aedeagal sheath; each flagellomere with two whorls of simple circumfila, one in the subapical and the other one in the middle of the node (*H. fallacicornis* group) 2
Aedeagus (Fig. 7) without aedeagal sheath; each flagellomere (Fig. 3) with one whorl of simple circumfila in the middle (*H. cylindrica* group) 3
2. Aedeagus longer than aedeagal sheath, exposed with a hyaline tip; cerci as long as hypoproct; flagellomeres stout and short; body colour red *H. fallacicornis* Kieffer
Aedeagus almost as long as aedeagal sheath, not exposed; cerci shorter than hypoproct; flagellomeres slender and long; body colour yellowish *H. ligniola* Kieffer

3. Aedeagus without sclerotized prominences subapically; cerci cordiform, with a broad rounded emargination
..... *H. cylindrica* Kashyap
Aedeagus (Fig. 7) dorsally at distal 1/8 with a pair of highly sclerotized small rounded prominences protruding to apex; cerci (Fig. 6) with a deep narrow incision
..... *H. bipromiens* sp. nov.

5 Species of *Holobromia* in China

5.1 *Holobromia bipromiens* sp. nov. (Figs 1-7)

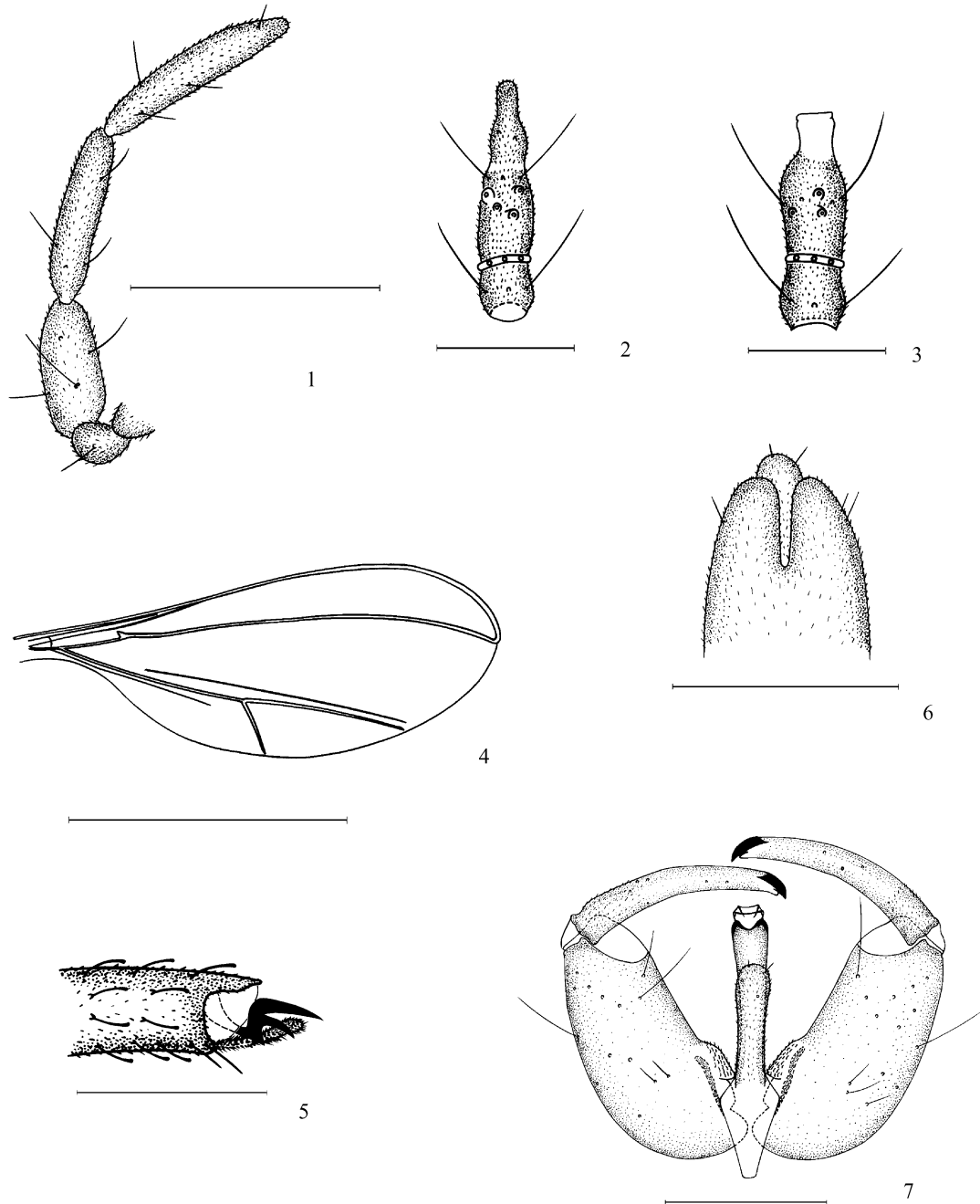
Male. Body colour brown. Body length 1.5-1.6 mm. Wing length 1.7-1.8 mm, width 0.7-0.8 mm.

Head. Postvertical peak very small. Eye bridge nine facets long at vertex. Palpus (Fig. 1) sparsely setose, 4 + 1-segmented (including palpiger), all segments subcylindrical, the first segment 1.0-1.3 times as long as wide, the second segment 2.1-2.4 times as long as wide, 1.8-2.4 times longer than the first, the third segment 3.7-4.7 times as long as wide, 1.4-1.6 times longer than the second; the fourth segment is the longest of all, 6.1-6.6 times as long as wide, 1.2-1.4 times longer than the third, proportion of palpus segments from first to fourth: 1.0: 1.8-2.4: 2.8-3.2: 3.4-3.7. Antenna 2 + 12 segments, scape frustum-shaped, pale; pedicel subglobose, darker and smaller than scape, both of them densely covered with setae and scales ventrally; all flagellomeres subcylindrical, a little constricted at basal third, each node with one whorl of appressed, band-shaped circumfila in the middle and two whorls of long, strong, irregular setae, one basal and one subapical whorl, also with several U-shaped setal alveoli subapically, mostly covered with microtrichia; neck shorter, 0.28-0.32 times the length of node; first flagellomere stipitate basally and longest of all flagellomeres from first to eleventh, decrease in length, first and second flagellomeres fused, the node of the third flagellomere (Fig. 3) 2.4-2.6 times as long as wide, and the neck of the third flagellomere 1.3-1.4 times as long as wide, 0.29-0.31 times length of node; terminal flagellomere (Fig. 2) with apical probongation covered with microtrichia, 0.6-0.7 times the length of node; the basal half probongation broadened, distal half fingerlike, rounded apically; the node of terminal flagellomere 2.8-3.0 times as long as wide.

Thorax. Wing (Fig. 4) hyaline, 2.5-2.6 times as long as wide. Rs very weak, only visible at base; vein C₁, R₁ densely covered with narrow scales and setose and as strong as R₅; vein R₅ arched backwards, joining costa beyond wing apex; vein M₃ present but invisible basally and distally; vein Cu forked; vein PCu parallel with Cu. Legs densely covered with narrow scales and sparsely setae; tibia of each leg approximately as long as femur; the second tarsus shorter (0.85-0.90 times) than the length of

tibia, proportion of fore tarsal segments from first to fifth 1.0: 9.8-11.8: 5.4-6.2: 4.3-4.8: 2.5-2.8. Tarsal claw (Fig. 5) basally toothed on all legs; curved almost at right angle at basal third; basal tooth

falciform, slightly bent with small triangle projection basally; 2/3 the length of claw; empodium shorter than the claw.



Figs 1-7. *Hobbsia bipartita* sp. nov. 1. Male palpus 2. Male twelfth flagellomere of antenna 3. Male third flagellomere of antenna 4. Male wing 5. Male fore tarsal claw and empodium (lateral view). 6. Cerci and hypoproct of male (dorsal view). 7. Male genitalia (dorsal view, cerci removed). Scale bars 1, 6-7= 0.1 mm; 2-3, 5= 0.05 mm, 4= 1.0 mm.

Abdomen The terga and sterna are rectangular; the former wider than the latter; terga 1-6 with one row of caudal setae distally and terga 1-7 with few lateral setae in the middle; sterna 2-5 with one row of caudal setae distally; sterna 6-8 with a double row of caudal setae distally and sterna 2-8 covered with several sparse setae in the middle.

Genitalia (Figs 6-7). Gonocoxite slim and long 2.4-2.5 times as long as wide; inserted with several long setae subapicodorsally and subapicoventrally with a blunt unconspicuously projecting densely pubescent mediobasal lobe; gonostylus arched and slender; 6.5-6.6 times as long as wide; gradually thinner from base to apex; 0.7-0.8 times the length of

gonocoxite covered with a few sparse sensory hairs mostly except for at base ectally with microtriche toothed apically; cerci (Fig 6) discrete with a deep narrow incision, lobes rounded apically with a few long setae; hypoproct linear, rounded apically and slightly broadened apically; longer than cerci; aedeagus cylindrical, fuscous and highly sclerotized, slightly longer than gonocoxite mid-ventrally with two hyaline sensory pores unsymmetrically distributed dorsally at distal 1/8 with a pair of highly sclerotized, small rounded prominences protruding to apex and terminal hyaline opening dorsally with rounded-emarginated distal edge and two hyaline sensory pores at distal bilaterality while ventrally with two sclerotized conspicuous longitudinal frames at blunt edge extending ectally.

Female Unknown

Type material Holotypemale China, Yunnan, Jingdong Wuliang Mountain, Manwan (24.4°N, 100.8°E, alt 2200 m), 29 May 2001, LI Jun leg, collected at spiderweb. Paratypes 49 males same data as holotype.

Diagnosis This new species is similar to *H. cylindria* Kashyap from India in gonocoxite with a blunt, un conspicuous and densely pubescent mediobasal lobe, terminal flagellomere of male antenna with an apical probongation fingerlike distally. It can be distinguished from *H. cylindria* Kashyap by the following characteristics: aedeagus with sclerotized prominences subapically, while *cylindria* without prominences subapically; cerci with a deep narrow incision forming two lobes, the lobe is 1.5-1.6 times longer than wide in the middle while cerci of *cylindria* cordiform, with a broad rounded emargination.

全带瘿蚊属分类学研究及中国一新种记述 (双翅目, 瘿蚊科)

焦克龙 卜文俊*

南开大学生命科学学院昆虫研究所 天津 300071

摘要 对全带瘿蚊属 *Holobromia* Kieffer 的属征进行修订, 编写该属世界分种检索表 (雄性), 并记述采自云南景东无量山的该属 1 新种, 命名为双突全带瘿蚊 *Holobromia bipromiens* sp. nov., 模式标本保存在南开大学昆虫标本馆。

双突全带瘿蚊, 新种 *Holobromia bipromiens* sp. nov. (图 1 ~ 7)

新种与分布于印度的 *Holobromia cylindria* Kashyap 1987 在雄外生殖器的中基瓣及触角末节等特征相似, 但区别明显: 1) 新种阳茎近端部 1/8 处背面两侧具 1 对骨化强的伸

关键词 双翅目, 瘿蚊科, 单瘿蚊族, 双突全带瘿蚊, 新种. 中图分类号 Q969.445.6

forming two lobes, the lobe is 1.0-1.1 times longer than wide in the middle.

Etymology The specific name of the new species *bipromiens* is a feminine Latin composite adjective meaning "two-prominenced", referring to the two small rounded prominences of aedeagus subapicodorsally.

Acknowledgements We thank Dr. LI Jun (Institute of Entomology, Nankai University, China) for collecting samples in Yunnan, China.

REFERENCES

- Gagné, R. J. 1981. Cecidomyiidae. In: McApine, J. E. et al (eds), Manual of Nearctic Diptera Vol. 1. Research Branch Agriculture, Canada Ottawa pp. 257-292.
- Grover, P. 1975. Studies on gall midges from India-XL Keys to gall midges of Oriental Region. *Cecidologia India*, 10 (1-2): 1-106.
- Kashyap, V. 1987. First record of genus *Holobromia* Kieffer (1912) from India. *Cecidologia Internationalis*, 8: 107-111.
- Kieffer, J. J. 1904. Nouvelles cécidomyies xylophiles. *Annales de la Société Scientifique de Bruxelles*, 28: 367-409.
- Kieffer, J. J. 1912. Neue Gallmücken-Gattungen. *Bitsch, France Maradit*, 11: 10-11.
- Kieffer, J. J. 1913. Nouvelles cécidomyies mycophiles et xylophiles. *Maradit*, 12: 45-56.
- Manay, B. M. 1965. Replacement of secondary sexual characters and origin of new taxonomic groups of insects exemplified by gall midges (Cecidomyiidae Diptera). *Zhurnal Obshchei Biologii*, 26: 677-684.
- Manay, B. M. 1969. Family Cecidomyiidae (Ironidae). In: Beibienko, G. Ya. (ed), Keys to the insects of the European part of USSR Vol. V. Diptera and Siphonaptera Part I. Leningrad. Published in English, 1988. American Publishing Co., Ltd, New Delhi pp. 356-420.
- Rübsaam, E. H. and Hedicke, H. 1925-1939. Die Cecidomyiden (Gallmücken) und ihr Cecidien. *Zoologia*, 29: 1-350.
- Skuhravý, M. 1997. Family Cecidomyiidae. In: Papp, L. and Darvas, B. (eds) Contribution to a Manual of Palearctic Diptera Vol. 2. Science Herald, Budapest pp. 71-204.

向端部的角状突, 而 *H. cylindria* 无此角状突; 2) 新种的尾须凹入较深窄, 形成两瓣, 每瓣长度是其中部宽的 1.5~1.6 倍; 而 *H. cylindria* 尾须中部凹入略宽浅, 每瓣长度是其中部宽的 1.0~1.1 倍。

正模 ♂, 云南景东无量山漫湾 (24.4°N, 100.8°E), 海拔 2200 m, 2001-05-29 李军采自蜘蛛网; 副模: 49 ♂♂, 同正模。模式标本保存在南开大学生命科学学院昆虫标本馆。

词源: 种名 *bipromiens* 为一阴性复合拉丁形容词, 意为“双突起的”, 指该种阳茎近端部背面有一对骨化的突起。

* 通讯作者。